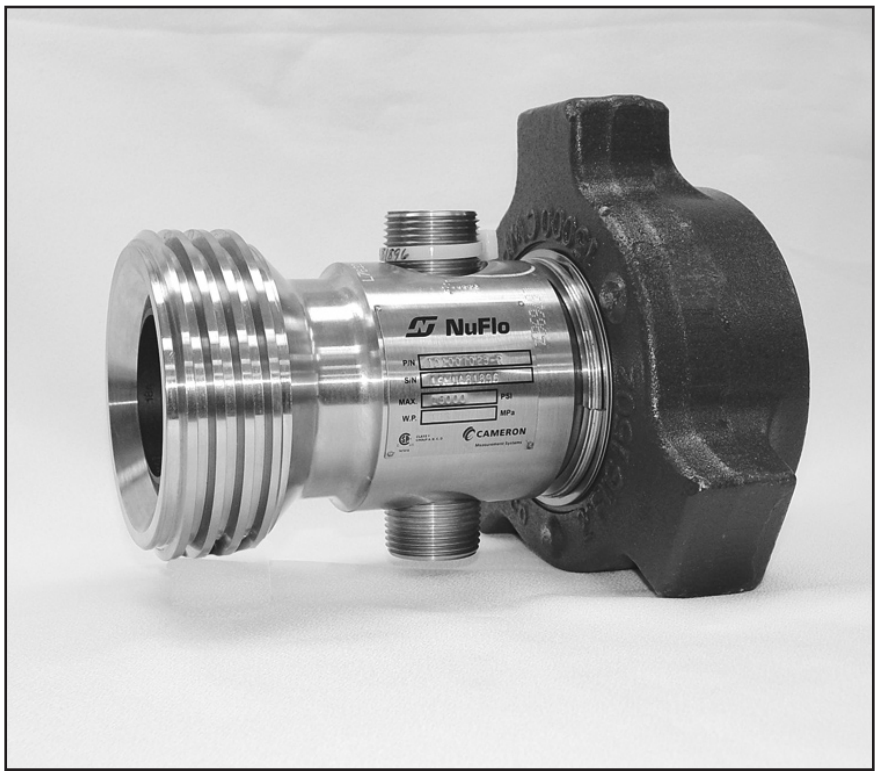
NUFLO™

WECO® 1502
Liquid Turbine Flowmeter

User Manual



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Description

The NuFlo™ WECO® 1502 Liquid Turbine Flowmeter (Figure 1) is a rugged versatile sensor capable of handling a wide variety of liquids including many types of slurries and suspensions. The flowmeter contains a rotor secured to a tungsten carbide shaft. The shaft is supported at each end in tungsten carbide bearings. The rotor is made of a magnetic material, while the flowmeter body is non-magnetic. A magnetic pickup consisting of a magnet and coil is mounted externally in the body in the same plane as the rotor. Fluid moving through the flowmeter causes the rotor to rotate at a speed proportional to the fluid velocity. The rotor blades cutting the magnetic field in the vicinity of the magnetic pickup create a frequency signal proportional to the fluid velocity. This signal is used to represent flow rate and can be accumulated to totalize the volume of liquid through the flowmeter.

For easy reference, the meter specifications to include part number, serial number, material, nominal diameter (DN), and maximum working pressure are imprinted on a stainless steel tag on the meter body (Figure 2, page 6).

Each flowmeter is furnished with a calibration factor representing the number of pulses per gallon produced during the calibration process. Precalibrated rotor and vane kits are available for field replacement (see Table 2, page 9). Meters and kits have a linearity of ±1%.

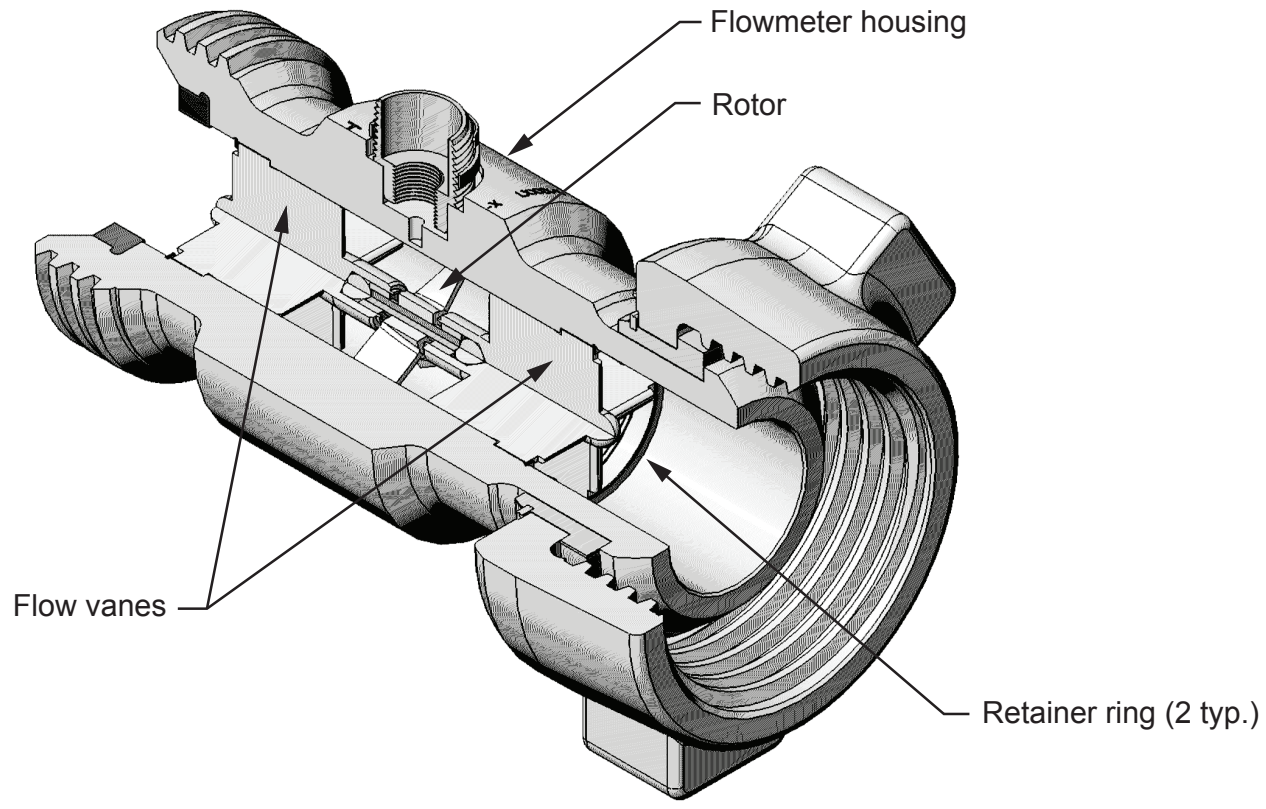


Figure 1—Nomenclature

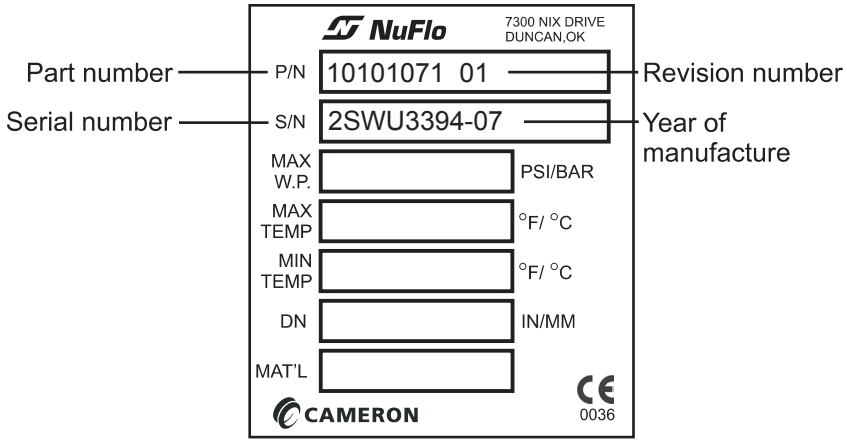


Figure 2—Example of product identification tag on flowmeter body

Safety Precautions

Always observe the following precautions when installing or operating the flowmeter:

- Clean all upstream lines before installing the flowmeter.
- Do not blow out lines with compressed air or gas after the meter is installed.
- Do not slug the flowmeter with fluid. Initial filling of line with fluid should be done with care.
- Do not exceed maximum recommended flow rates through the flowmeter (Table 2, page 9).
- Avoid hammer blows or other sharp impacts on the flowmeter; it may break the shaft.
- If the end connection leaks at the time of installation, remove pressure before attempting to seal.
- The customer is responsible for ensuring chemical compatibility between the meter materials and any fluids being metered.
- The meter will retain the temperature of the fluid. Use caution when touching the meter body.

Flowmeter Installation

Install the NuFlo™ WECO® 1502 Liquid Turbine Flowmeter as follows. The flowmeter may be oriented in a vertical or horizontal position.

1. Install a straight section of pipe on either side of the meter.
    - This pipe must be the same nominal pipe size as the meter with a length of at least 10 pipe diameters upstream and 5 pipe diameters downstream. (For example, a flowmeter with a 2-in. nominal diameter requires a 2-in. pipe. The section of straight pipe upstream must be 20 in.; the section downstream must be 10 in.)
    - Do not install throttling valves upstream of the flowmeter.
2. Align the meter bore with the pipe, ensuring that the direction of flow corresponds with the direction of the arrow engraved on the meter body.
3. Using caution, tighten the hammer union nuts for a leak-proof seal. Impact to the side of the meter can damage the internals.

4. Install the magnetic pickup as follows, referencing Figure 3 as needed:

   a. Screw the magnetic pickup clockwise into the conduit adapter until finger-tight. Then rotate the pickup counter-clockwise one quarter turn. Do not tighten with pliers.

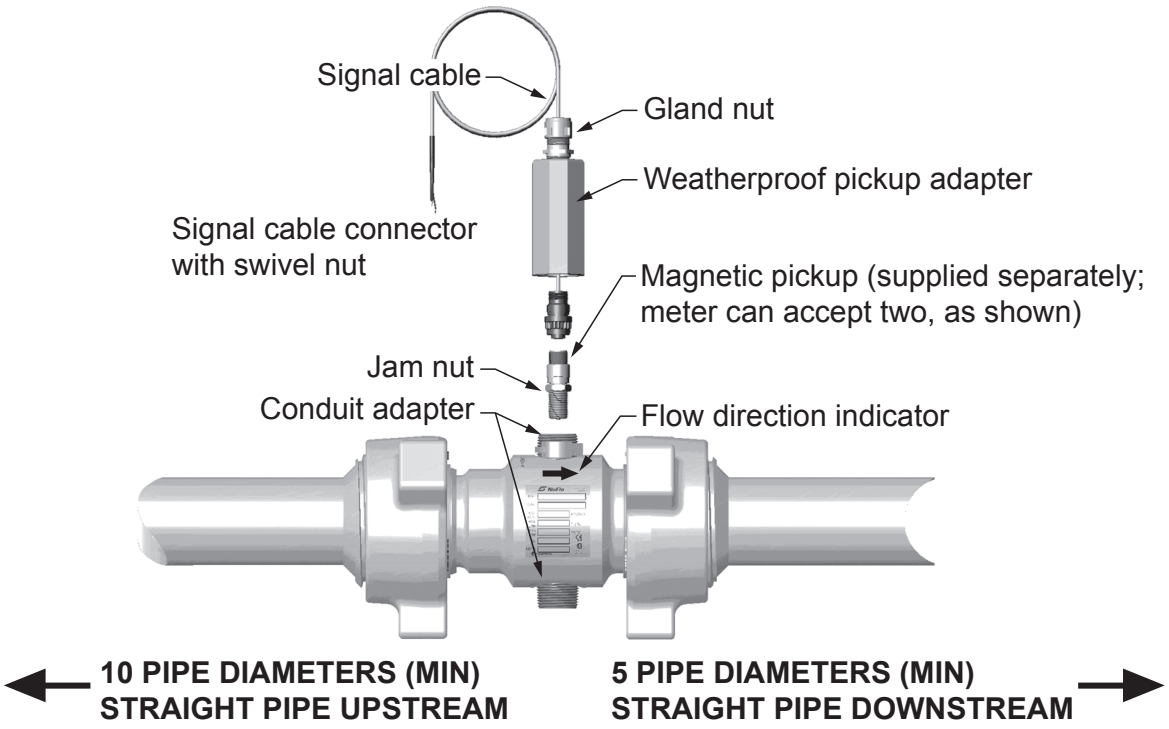
   b. Turn the jam nut clockwise until the pickup is secure. A ¾-in. 12-point deep thin wall socket wrench (Part No. 9A-100013146) is required.

   c. Attach the signal cable connector to the pickup and turn the swivel nut until the connection is snug. Do not over-tighten.

   d. Loosen the gland nut so that the weatherproof pickup adapter rotates freely without twisting the signal cable.

   e. Slip the weatherproof pickup adapter over the pickup and tighten.

   f. Tighten the gland nut until the rubber grommet seals around the signal cable.


Signal cable
Gland nut
Weatherproof pickup adapter
Signal cable connector with swivel nut
Magnetic pickup (supplied separately; meter can accept two, as shown)
Jam nut
Conduit adapter
Flow direction indicator
10 PIPE DIAMETERS (MIN) STRAIGHT PIPE UPSTREAM
5 PIPE DIAMETERS (MIN) STRAIGHT PIPE DOWNSTREAM

NOTE: Pipe must be of same nominal size as flowmeter end connection.

Figure 3—Installation of magnetic pickup

Flowmeter Maintenance

The flowmeter may be disassembled for inspection, cleaning or repair. The following instructions are applicable to all meter sizes except as noted.

Disassembling the Flowmeter

1. Screw the magnetic pickup out of the meter body to avoid damage during handling of the meter.
2. Remove the retainer ring from one end of the meter body.
3. Slide the vane from the meter body. Note: Some slotted meters may require a slight twist of the vane to align the vane with the slot in the meter body. (If the vane is stuck, insert a brass rod through the opposite vane and through the rotor and drive the vane out by tapping on alternate blades of the vane.)
4. Remove the rotor. Handle it with care to prevent damage to the rotor shaft.
5. Remove the retainer ring from the other end of the meter body.
6. Remove the second vane.
7. Do not attempt to remove the bearings and thrust balls from the vanes.
8. Clean all parts with a solvent suitable for removing the material that has flowed through the meter. A cotton swab is very useful for cleaning the inside diameter of the bearings.

Important **If the meter internals are damaged, always replace the entire kit (Table 2, page 9). Never exchange only the damaged piece. The kits are provided as a calibrated set of components. Accuracy will be sacrificed by replacing just individual parts.**

Reassembling the Flowmeter

The meter is assembled in the following manner:

1. Note that the arrows that are cast or engraved on each part, indicating the direction of flow. When the meter is assembled, these arrowheads and the arrow engraved on the meter body (see flow direction indicator in Figure 3, page 7) must point in the direction that product will flow through the meter.
2. Note that one of the blades on each vane has an arrow on it. Also note that retainer pins or notches are provided at each end of the meter body. The marked blade must be inserted between these retainer pins or notches that are opposite the conduit adapter (or on the bottom of the meter body). The meters are calibrated in this position, and should be reassembled in this position for the greatest accuracy.
3. Insert one of the vane assemblies in the meter body bore, taking care to orient the flow direction arrows correctly. The vane should fit snugly but should not require excessive force to install. Install the retainer ring.
4. Install the rotor, being careful to properly orient the direction arrow on the rotor. Care should be taken to avoid chipping the rotor shaft. Tungsten carbide is very brittle.
5. Insert the second vane assembly. If this vane does not fall into position when placed in the meter body, rotate the rotor, if possible, to align the bearing and rotor shaft. Do not attempt to drive the vane in, as this will result in a broken rotor shaft. Install the retainer ring.

6. Spin the rotor by hand, making sure that the rotor moves freely. If the rotor will not turn or stops abruptly, the meter should be disassembled and checked.
7. The meter is now ready for installation. Follow the flowmeter installation procedure as described on page 6.

Flow Rate Specifications

Table 1—Linear Flow Range[1,2]

Flowmeter Size in. (mm)	GPM	M^3/hr	BPD	Nominal[(2)] Cal. Factor pulses/gal (pulses x 1000/m^3)	Max. Output Frequency pulses/sec	ΔP at Max. Flow[(2)] psi (kPa)
1 (25)	5 - 50	1 .14 - 11.36	170 – 1700	900 (238)	750	20.0 (138)
1 ½ (38)	15 - 180	3.41 - 40.88	515-6000	325 (86)	975	16.0 (110)
2 (51)	40 - 400	9.09 - 90.85	1300-13000	55 (14.5)	365	22.0 (152)
3 (76)	80 - 800	18.16-181.66	2750 – 27500	57 (15.2)	760	20.0 (138)

1. The linear flow range of liquids with non-lubricating characteristics is limited to the upper 60% of rating.
2. Based on water.

Replacement Kits

Each replacement kit contains a rotor, two vane assemblies, two retainer rings, and a calibration tag. All components are calibrated as a set and should be installed as a set. Components should not be installed individually.

Table 2—Replacement Kits

Meter Size (in.)	Kit Part Number
1	9A-100003527
1-1/2	9A-100003469
2	9A-100003474
3	9A-100003470

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